Chemistry 313 – Chapter 2 Part II Review Name Key

1. Write the electron configuration and draw the Lewis dot diagrams for the following elements.

copper
29
$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^9$
$[Ar]\,4s^2 3d^9$
Cu·

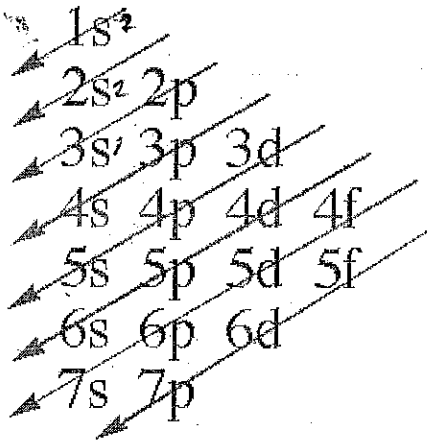
iodine
53
$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^5$
$[Kr]\,5s^2 4d^{10} 5p^5$
·I:

fluorine
9
$1s^2 2s^2 2p^5$
$[He]\,2s^2 2p^5$
·F:

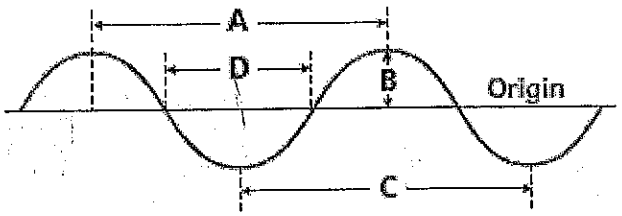
sulfur
16
$1s^2 2s^2 2p^6 3s^2 3p^4$
$[Ne]\,3s^2 3p^4$
·S:

calcium
20
$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$
$[Ar]\,4s^2$
Ca·

magnesium
12
$1s^2 2s^2 2p^6 3s^2$
$[Ne]\,3s^2$
Mg·



Use the figure to answer the following questions.



2. Which letter(s) represent one wavelength? A, C

3. Which letter(s) represent one amplitude? B

4. If twice the length of A passes a stationary point every second, what is the frequency of the wave? 2/s

For each statement below, determine if it is true (T) or false (F)

T 9. A quantum is the minimum amount of energy that can be lost or gained by an atom.

F 10. Like the visible spectrum, an atomic emission spectrum is a continuous wave of colors.

T 11. Each element has a unique atomic emission spectrum.

T 12. A flame test can be used to identify the presence of certain elements in a compound.

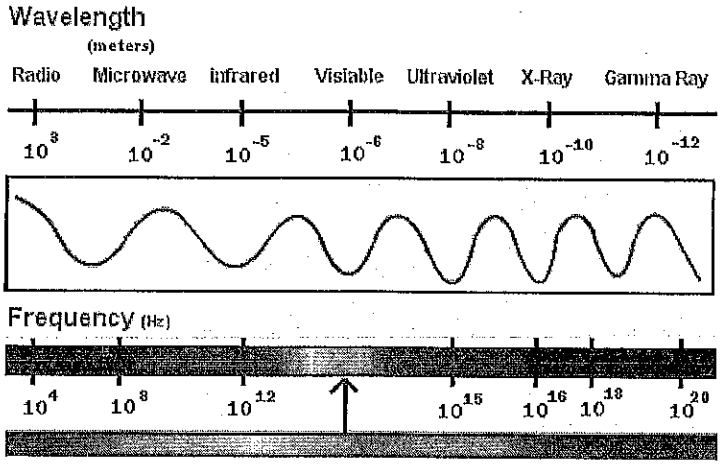
T 13. The fact that only certain colors appear in an element's atomic emission spectrum indicates that only certain frequencies of light are emitted.

T 14. Atomic emission spectra can be explained by the wave model of light.

F 15. The neon atoms in a neon sign emit their characteristic color of light as they absorb energy.

T 16. When an atom emits light, photons having certain specific energies are being emitted.

THE ELECTRO MAGNETIC SPECTRUM



17. Circle the arrow that correctly represents the relationship between the following variables. **1.5 points**

Frequency increases, so wavelength ↑ ↓ (↓ circled)

Frequency increases, so energy (↑ circled) ↓

Wavelength increases, so energy ↑ (↓ circled)

18. What is the wavelength of electromagnetic radiation having a frequency of 5.00×10^{12} Hz? What kind of electromagnetic radiation is this? **2.5 points**

$c = \lambda\nu$ $\lambda = \frac{c}{\nu}$ $\frac{3.00 \times 10^{8}}{5.00 \times 10^{12}} = 6 \times 10^{-5}\ m$ Infrared

19. What is the energy of a photon of red light having a frequency of 4.48×10^{14} Hz?

$E = h\nu$ $E = (6.626 \times 10^{-34})(4.48 \times 10^{14}\ Hz) = 2.97 \times 10^{-19}\ J$

20. What is the speed of an electromagnetic wave having a frequency of 1.33×10^{17} Hz and a wavelength of 2.25 nm?

3.00×10^{8} m/s all waves travel at the same speed.